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The construction is shown for the tangents at P_1, P_3, P_4, P_5 . T_2 coincides with R_2 .

At diametrically opposite points, corresponding to equal and opposite values of k , the slope is the same; at two such points the tangents are parallel.

Graph for a Cubic Equation.—If the graph is to be used in connection with the solution of a cubic equation, the value of $\alpha = a^2$ is arbitrary, and may be so chosen as to separate or crowd the roots. The original axes may conveniently be located after the graph is drawn—with reference to the axes IL, IM , their intersection is at $(\beta/3, (1/27\alpha)(9\beta\gamma - 2\beta^3 - 27\delta))$. If it is convenient to make $a = c$, *i. e.*, $\alpha = \beta^2/3 - \gamma$, the construction will be somewhat simplified, as then $MR = IK$, and the point Q becomes superfluous.

The figure illustrates the construction for Case (1), showing seven points, with tangents, on each side of the inflection: the three special points P_2, P_4, P_5 , a point in each of the segments IP_2 and P_2P_4 , and two points beyond P_5 .

In Case (2) or Case (3), fewer points would give an equally good guide for sketching the graph.

NOTES AND NEWS.

EDITED BY D. A. ROTHROCK, Indiana University, Bloomington, Ind.

Dr. W. H. WILSON has been appointed instructor in mathematics at the Massachusetts Institute of Technology.

Associate Professor W. B. FORD, of the University of Michigan, has been promoted to a full professorship of mathematics.

Miss PAULINE SPERRY, of Smith College, has accepted a position as instructor in mathematics at the University of California.

Assistant Professor L. A. RICE, of Syracuse University, has resigned to become instructor in mathematics at Tufts College.

Dr. IDA BARNEY, formerly instructor in Smith College, has been appointed professor of mathematics in Lake Erie College.

Professor W. A. GARRISON, of Union College, has been appointed professor of mathematics at King College, Bristol, Tennessee.

At the University of Nebraska, Miss L. RUNGE and Mr. A. BABBITT have been promoted to assistant professorships of mathematics.

Dr. A. W. HOBBS, of Johns Hopkins University, has been appointed instructor in mathematics at the University of North Carolina.

At the Southern Methodist University, Dallas, Texas, Associate Professor E. H. JONES has been promoted to a professorship of mathematics.

At the University of Toronto, Dr. SAMUEL BEATTY has been promoted to an assistant professorship of mathematics.

Dr. R. A. JOHNSON, of Adelbert College, Western Reserve University, has been appointed professor of mathematics at Hamline University, St. Paul, Minn.

At McPherson College, Kansas, Professor A. B. FRIZELL has resigned from the department of mathematics.

At Northwestern University, Dr. E. J. MOULTON has been promoted to an associate professorship of mathematics; and Mr. F. L. KERR and Mr. A. D. CAMPBELL have been appointed to instructorships in mathematics.

Professor S. F. NORRIS, of the department of mathematics in Baltimore City College, and a charter member of the Association, died on September 4, 1917.

Dr. M. O. TRIPP has resigned the professorship of mathematics at Olivet College, Olivet, Mich., and has accepted an assistant professorship at the University of Maine.

Professor A. D. BUTTERFIELD, head of the department of mathematics at Worcester Polytechnic Institute, has resigned to accept a commission in the aviation service of the U. S. government.

Dr. C. H. YEATON, assistant professor of mathematics at Northwestern University, and Mr. G. R. MIRICK, assistant in mathematics at the University of Michigan, have entered the national service, the former in connection with the Signal Corps at St. Louis, Mo.

At Louisiana State University, Assistant Professor S. T. SANDERS has been promoted to the headship of the department of mathematics, and Dr. I. C. NICHOLS has been appointed associate professor in the department.

Associate Professor R. P. BAKER has been made acting head of the department of mathematics at the University of Iowa, and Mr. R. E. GLEASON has been made instructor in mathematics.

Cornell University has granted leave of absence for the year 1917-18 to Dr. L. L. SILVERMAN, instructor in mathematics, for service upon the committee of public safety of the state of Massachusetts.

Mr. M. HEDLUND, for two years instructor in mathematics at Beloit College, was commissioned a second lieutenant in the Adjutant General's office at the close of the first officers' training school at Ft. Sheridan.

Professor H. E. HAWKES, of the department of mathematics of Columbia University, will be acting dean of Columbia College during the absence of Dean KEPPEL who is serving as confidential secretary to the Secretary of War.

At the University of Michigan, Mr. HERMAN BETZ, of Cornell University, has been appointed instructor in mathematics.

Mr. C. H. CLEVENGER, instructor in mechanics and mathematics at the University of Minnesota, has resigned to accept a position as assistant in an

investigation of stresses in chilled cast iron car wheels being conducted at the University of Illinois.

Dr. G. W. SMITH, formerly instructor in mathematics at the University of Colorado, has been appointed instructor in mathematics at Beloit College, Beloit, Wisconsin. Dr. SMITH did his graduate work at the University of Illinois, where he received the doctorate in June of this year.

The De Morgan medal, awarded every third year by the London Mathematical Society for eminent work in mathematics, has been awarded during the past ten years as follows: to Professor GLAZIER (1908), to Professor LAMB (1911), to Professor LARMOR (1914) and to Professor W. H. YOUNG (1917).

Professor J. F. MILLIS, who for a number of years has been head of the department of mathematics in the Parker School of Chicago, died at his home in Chicago on October 25, 1917, at the age of forty-two years. Professor MILLIS was the joint author of the well-known Stone-Millis series of elementary mathematical text-books.

Two charter members of the Association, Mr. O. S. ADAMS, and Mr. W. D. LAMBERT, of the Coast and Geodetic Survey, have been transferred to the War Department as first lieutenants and have entered the active service. Mr. P. C. PORTER, also a charter member, is enrolled in the army aviation ground-school at the University of Texas.

At the College for Women, Western Reserve University, Professor ANNA H. PALMIÉ has been granted leave of absence, her place being supplied by Dr. MARY F. CURTIS as instructor in mathematics. Mrs. W. E. BECKWITH has been promoted to an assistant professorship of mathematics.

During the summer Professor W. R. RANSOM, of Tufts College, had charge of Navigation Schools for the U. S. Shipping Board at Philadelphia. Professor D. T. WILSON, of Case School of Applied Science, gave instruction in the elements of navigation to men who are candidates for the merchant marine, and who have only elementary mathematical knowledge.

The feature of the opening number of Vol. XXIV of the *Bulletin* of the American Mathematical Society is a forty-six page paper by Professor G. A. BLISS, of the University of Chicago, on the "Integrals of Lebesgue," giving in detail the substance of Professor BLISS's symposium lecture presented at the April meeting of the Chicago Section of the Society.

At Purdue University, Professor T. G. ALFORD and Professor JACOB WESTLUND have retired from active service, the former on account of age, the latter on account of disability. Each has been granted a retiring allowance. Associate Professor WILLIAM MARSHALL has been promoted to a full professorship of mathematics, and instructor GLENN JAMES has been promoted to an assistant professorship.

Dr. RUTH E. GENTRY, formerly instructor in mathematics at Vassar College and a member of the American Mathematical Society, died at Indianapolis, Indiana, on October 15, 1917. Miss GENTRY was a graduate of the University of Michigan, received her doctorate at Bryn Mawr College, and as holder of a scholarship from the Association of Collegiate Alumnae she studied in Berlin and Paris.

The "Guide to the Study and Use of Reference Books," recently issued by the American Library Association, lists the following mathematical works: *Encyclopédie des Sciences Mathématiques*; *Historical Introduction to Mathematical Literature*, by G. A. MILLER; *Mathematisches Vokabularium*, by FELIX MÜLLER; *Smithsonian Mathematical Tables*; and *Memorabilia Mathematica*, by R. E. MORITZ.

Dr. J. D. MADDRILL, of the Travelers Insurance Company, and former director of the International Geodetic Observatory at Ukiah, Calif., and instructor in insurance mathematics at the University of California, has become actuary of the bureau of efficiency and economy at Washington. Among Dr. MADDRILL'S duties at Washington will be the preparation of a plan for pensioning the 300,000 civil employees of the government.

The Paris Academy of Sciences has awarded the following prizes in mechanics and mathematics: The Bordin prize of 3,000 francs to M. GASTON JULIA, now an officer in the French army; the Francoeur prize of 1,000 francs to M. HENRI VILLAT, for his publications on hydrodynamics; the Montyon prize of 700 francs to M. RENÉ DE SAUSSEURE, of Geneva, for his work in mechanics; and the Poncelet prize of 200 francs to M. JULES ANDRADE, professor at Besancon, for work in applied mechanics.

"A Sixth List of Writings on Determinants" by Sir THOMAS MUIR has appeared in Vol. XLVII, 1917, of *The Quarterly Journal of Pure and Applied Mathematics*. The five lists preceding the present one, also appearing in *The Quarterly*, cover the periods to 1880, 1885, 1900, 1905, 1910, respectively, and the sixth list covers the period from 1910-1915. The sixth list consists of titles and authors, date and place of publication, of four hundred twenty-four different publications.

At the University of Illinois, Dr. E. F. SIMONDS, of Columbia University, has been appointed instructor in mathematics; Mr. A. W. LARSEN has been appointed assistant in mathematics; and instructors Dr. C. M. HEBBERT and Dr. F. W. REED are teaching in the school of aviation. Dr. L. M. KELLS, instructor in mathematics, has entered the National Army at Camp Dodge.

At the University of Maine, Assistant Professor T. L. HAMLIN has resigned to accept a position in the department of mathematics at Union College, Schenectady, N. Y., and Mr. R. WOODS, instructor in mathematics, has resigned to do graduate work in the University of Illinois.

Baron KIKUCHI, the noted Japanese mathematician and scientist, died at his home in Japan on August 19, 1917, at the age of sixty-three years. His university training was obtained in England, where he was sent by the Japanese government. He entered Cambridge at the age of fifteen and was graduated among the wranglers at the age of twenty-two. Returning to Japan, he was immediately appointed professor of mathematics in the Imperial University, a position which he occupied for twelve years. Later he was dean of the College of Science, president of the Tokyo Imperial University, director of the Peer's School, president of the Kyoto Imperial University, and in 1901 he was appointed minister of education. In 1909-1910 Baron KIKUCHI visited England and the United States, giving lectures on Japanese education.

M. PAUL PAINLEVÉ, formerly professor of mathematics at the University of Paris and professor of mechanics at the Paris Polytechnic School, was chosen premier of the French Republic and served in that capacity until the recent overthrow of the French cabinet. While he was premier, the New York Evening Post made the following comment: "France has three of her most important posts in government and army filled by men especially renowned in mathematical proficiency. The Premier, M. PAINLEVÉ, knew enough at eleven and a half to have entitled him to his bachelor's degree, and later he attracted the attention of the mathematicians of Paris and was appointed to the professorships mentioned above. The commander-in-chief of the army, General PÉTAIN, now directing the gigantic struggle of the French armies, is a fine mathematician. And there is M. LOUCHEUR, the new minister of armaments, who gained especial mathematical distinction while a student at the Ecole Polytechnique."

The seventeenth annual meeting of the Central Association of Science and Mathematics Teachers will be held at Columbus, Ohio, on November 30 and December 1, 1917. At the opening general session Dr. W. O. THOMPSON, President of Ohio State University, will deliver an address on "Immediate and ultimate aims of science and mathematics teaching." At the mathematics section, Professor HARRIS HANCOCK, of the University of Cincinnati, will speak on "What course of study should be taken by a boy or girl in High School;" Mr. S. A. COURTIS, Supervisor of Educational Research, Detroit, Michigan, will speak on "Measurement of the products of teaching high school mathematics;" and Mr. J. A. FOBERG, of the Crane Junior College, Chicago, will present a report as chairman of the section committee on "mathematical requirements." Mr. Foberg is the representative of the Central Association delegated to act as a member of the National Committee on Mathematical Requirements now working under the auspices of the Mathematical Association of America.

The one hundred and ninety-third regular meeting of the American Mathematical Society was held* in New York on October 27, 1917. Eleven papers appeared on the printed program. The eleventh regular meeting of the Southwestern Section will be held at the University of Oklahoma on December 1, 1917.

The seventieth meeting of the American Association for the Advancement of Science will be held at Pittsburgh during the week from December 28, 1917, to January 2, 1918. The chairman of Section A, Mathematics and Astronomy, is Professor H. N. RUSSELL of Princeton University, and the secretary is Professor F. R. MOULTON of the University of Chicago.

The following extract of a letter from Professor PAUL MONTEL of Paris to Professor Hedrick will be of interest to many of our readers:

"I received your letter of May 18th, and I want to thank you cordially for your kind expressions regarding my country. Our confidence was strengthened both morally and materially by the entry of the United States into the war, but no one here had any idea at first that this support would assume the formidable character which it now seems likely to take. I can assure you that the powerful effort which your country is now making fills us all with admiration. Yesterday I met the members of the scientific mission which has just returned from the United States: FABRY, ABRAHAM, etc. They are all elated over the warmth and the sympathy of the reception which they received.

"I desire to tell you that the Council of the French Mathematical Society has decided to accept articles written in either French, English or Italian. Hence whenever you send us an article, it will not be necessary to have it translated, unless you yourself desire."

NOTES ON THE ASSOCIATION.

The third annual meeting of the Mathematical Association of America will be held at the University of Chicago on Thursday and Friday, December 27-28, 1917, immediately preceding and in conjunction with the Winter meeting of the Chicago Section of the American Mathematical Society. There will be a joint session of the two organizations on Friday at which Professor W. B. Ford, of the University of Michigan, will deliver his retiring address as chairman of the Chicago Section on the subject: "A conspectus of the modern theory of divergent series." There will be a joint dinner on Thursday evening. The dinner was previously announced for Friday evening but was changed to Thursday in order to avoid conflict with the dinner of the Association of University Professors which occurs on Friday evening and which many of the mathematicians will desire to attend.

Arrangements for these meetings are in the hands of a joint committee consisting of W. D. Cairns of Oberlin College, Arnold Dresden of the University of Wisconsin, W. B. Ford of the University of Michigan, H. L. Rietz of the University of Illinois, J. A. Foberg of the Crane Junior College, Chicago, D. F. Campbell of Armour Institute, H. E. Cobb of Lewis Institute, E. J. Moulton of Northwestern University, and H. E. Slaught, chairman, of the University of Chicago.

The program of the Association meetings is in charge of a committee of three: Elizabeth B. Cowley of Vassar College, O. D. Kellogg of the University of Missouri, and E. J. Wilczynski, chairman, of the University of Chicago. Heretofore all places on the programs of the Association meetings have been filled by direct invitation of the Program Committee, but on this occasion it is proposed to devote one session to papers submitted by members on their own initiative. Abstracts of papers intended for this meeting should be submitted in form for publication to the Program Committee for approval and should be in the hands of the Chairman on or before Saturday, December 1, 1917. Some portion of the program will also be devoted to questions of interest to institutions, and all institutional members are invited to send delegates.

Programs and full announcements of arrangements for this meeting will be mailed to all members early in December.

In accordance with the action of the Council at Cleveland, President Cajori has appointed a committee of five to consider the feasibility of publishing a mathematical dictionary. The committee consists of R. C. Archibald of Brown University, H. L. Rietz of the University of Illinois, D. E. Smith of Columbia University, H. E. Slaught of the University of Chicago, and E. R. Hedrick, chairman, of the University of Missouri. The committee is expected to make at least a preliminary report at the annual meeting in Chicago.

Following up the suggestion of Professor Archibald in discussing undergraduate clubs at the Cleveland meeting (see October *MONTHLY*, page 357) a decision has been reached to form a special department of the *MONTHLY* to be devoted to undergraduate clubs. In the next January issue we should like to publish as complete a list of clubs as possible together with statistics as to membership and meetings. Will our readers, then, furnish us with such information as they have relative to existing clubs and their programs and membership for both this year and last year. Secretaries of clubs are particularly requested to furnish the desired information. Communications relative to this matter may be sent to Professor R. C. Archibald, Brown University, Providence, R. I.

President Cajori has announced that he proposes to adhere to the principle declared by Professor Hedrick last year, namely, that it is deemed to be for the best interests of the Association that the president should not be renominated for a second consecutive term. This announcement has already been made known to the members in connection with the preliminary ballot sent out about November first.

The Council has authorized the submission of certain amendments to the Constitution and By-Laws of the Association. These will be voted on at the annual meeting in Chicago, and in accordance with the constitution they are published herewith for comment or suggestion by members:

Article III, Section 2, to be modified to read as follows:

The President and Vice-Presidents shall be elected annually for a term of one year, and four members of the Council shall be elected annually for a term of three years. They shall be eligible for reëlection, but not for more than two consecutive terms. The Secretary-Treasurer, and the Committee on Publications, consisting of the Manager, the Editor, and one other member, shall be appointed by the Council.

Article VI, Section 2, to be modified to read as follows:

The Council shall have full control of the publication and sale of the official journal.

By-Law 1, last sentence, to be modified to read:

Those who were admitted to membership before April 1, 1916, constitute the list of charter members.

By-Law 3, first sentence, to be replaced by the following:

Committees. The official journal shall be under the general management of the Committee on Publications. There shall also be appointed by the Council a Board of Associate Editors who shall give assistance in connection with the official journal under the direction of the Committee on Publications.

The above modifications are substantially as passed upon by the Council, except in the case of By-Law 1, which involves merely a change in tense of the verbs so as to conform to the present date.

The important changes in Article III of the Constitution pertain (1) to the Committee on Publications and (2) to the manner of choosing the Secretary-Treasurer. The reason for the first change is that the burdens of editorial work need to be further divided and distributed, and the reason for the second change is that the strictly business affairs of the Association need to be in the hands of an officer selected by the Council rather than elected by popular vote. All the other changes are consequences of these two.

The attention of institutional members is especially called to the report of the Committee on Libraries published in the October MONTHLY. A great amount of work has been expended by the committee in compiling this classified list and it is hoped that it may prove to be of real use, not only to institutional members, but also to all institutions of collegiate rank in the country, both as a means of checking the books now in their libraries and also as a stimulus to securing the books of this list not already possessed. In particular, it is hoped that this report may prove a real benefit to the mathematical departments of these institutions. The chairman invites correspondence on any matters pertaining to the suggestions contained in this report, and it is likely that a place may be provided on the program of the meeting for further discussion of it.